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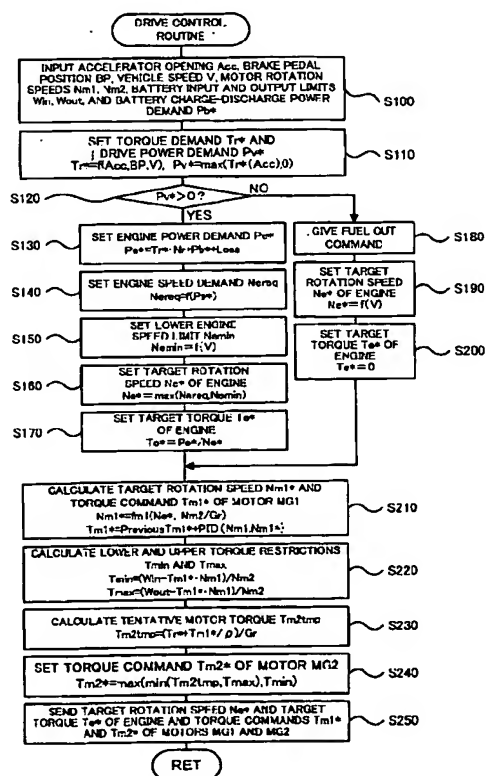
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(54) Title: HYBRID VEHICLE, CONTROL METHOD OF HYBRID VEHICLE, AND POWER OUTPUT APPRATUS

(57) Abstract: When a drive power demand  $Pw^*$  is greater than 0, the control procedure of the invention sets the greater between an engine speed demand  $Nreq$  and a lower engine speed limit  $Nmin$  to a target rotation speed  $Ne^*$  of an engine (step S160). The engine speed demand  $Nreq$  represents a rotation speed of the engine at a specific drive point that ensures efficient output of an engine power demand  $Pe^*$ . The lower engine speed limit  $Nmin$  represents a rotation speed of the engine at another specific drive point for a constant-speed drive of a hybrid vehicle at a current vehicle speed  $V$ . When the drive power demand  $Pw^*$  is equal to 0, the control procedure of the invention cuts fuel supply to the engine and sets the lower engine speed limit  $Nmin$  to the target rotation speed  $Ne^*$  of the engine (step S190). The engine is accordingly driven at the rotation speed of not lower than the lower engine speed limit  $Nmin$  and has a quick response to a demand for output power increase from the engine. This arrangement desirably reduces the loading of a battery and prevents premature deterioration of the battery.

### **Description**

Hybrid Vehicle, Control Method of Hybrid Vehicle, and Power  
Output Apparatus

#### **5 Technical Field**

The present invention relates to a hybrid vehicle, a control method of the hybrid vehicle, and a power output apparatus.

#### **10 Background Art**

One proposed hybrid vehicle has an engine, a planetary gear unit including a carrier and a ring gear respectively linked to a crankshaft of the engine and to a drive shaft, a first motor connected to a sun gear of the planetary gear unit, 15 a second motor connected to the drive shaft, and a battery capable of transmitting electric power to and from the first motor and the second motor (see, for example, Japanese Patent Laid-Open Gazette No. 11-93727). In this proposed hybrid vehicle, the first motor is driven and controlled to regulate 20 the rotation speed of the engine.

#### **Disclosure of the Invention**

In the hybrid vehicle equipped with the engine and the driving motor, the general control procedure varies the 25 rotation speed of the engine and intermittently activates and inactivates the engine with a variation in required engine power,